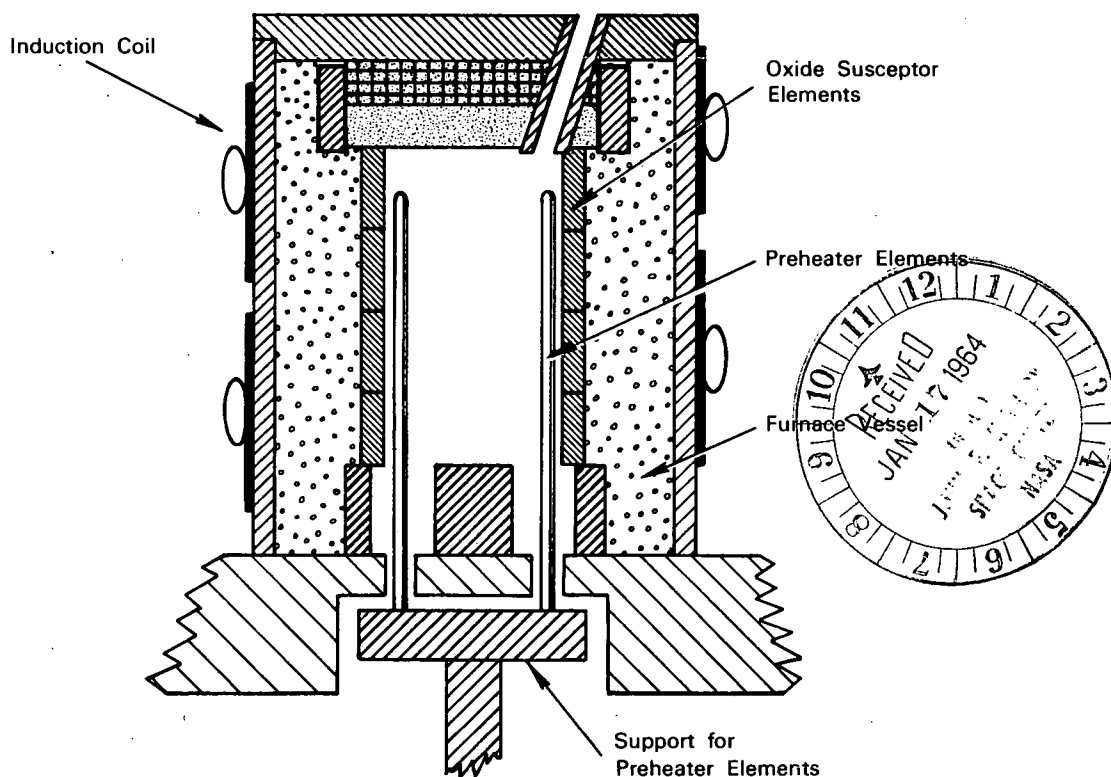


NASA TECH BRIEF



This NASA Technical Brief is issued by the Office of Technology Utilization to acquaint industry with the technical content of an innovation derived from the NASA space program.

Removable Preheater Elements Improve Oxide Induction Furnace



The problem: Preheating the oxide susceptor elements in an induction furnace to conducting temperature. Preheating by ordinary resistive elements has the advantages of simplicity and controllability, but resistive elements corrode or melt at elevated induction furnace operating temperatures.

The solution: Resistive preheater elements that can be easily withdrawn after raising the oxide susceptor elements to conducting temperature.

How it's done: An oxide induction furnace is constructed with two small holes in its base. Resistive preheater elements are mounted on a support so that the elements can be inserted or removed from the furnace. An induction coil carrying high frequency current is mounted on the outside of the furnace.

To operate the furnace, the preheater elements are put in place and begin heating the oxide susceptor elements to the temperature at which they conduct

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electricity. The preheater elements are then removed and the induction coil energized. This activates the oxide rings which heat the furnace to the desired temperature. Because the preheater elements can be removed they solve the problems of melting and corrosion yet present no difficult operational problems.

Notes:

Induction furnaces are employed in the hardening of many machine parts including gears, hinge pins, shafts and guide rails as well as continuous annealing

of steel strip and the reheating of tin plate strip for tin reflowing. This method offers the advantages of quick heating, less oxidation, less loss of metal, better die life and better control of forging temperature.

Patent status: NASA encourages commercial use of this innovation. No patent action is contemplated.

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